

FAST FACTS:

Ports, Movement of Goods, and Community Health



Community Outreach and Education Core, Center for Ecogenetics and Environmental Health, University of Washington

The Port of Seattle^{2,3,4,5}

- Seatrade: The Port of Seattle handled \$39.5 billion dollars worth of internationally traded goods in 2007. Los Angeles, the nation's busiest port, handled over \$240 billion.
- The Port of Seattle is the 6th busiest in the nation, and in the top 50 globally.
- The Port of Seattle's top trade partners are China, Japan, South Korea, Taiwan, and Indonesia.
- Top exports from Seattle include machinery, grains, seeds, fruit, and cereals.
- Top imports into Seattle are toys and sports equipment, electric machinery, vehicles, and apparel.
- Maritime activities account for 28% of the total diesel emissions in the Puget Sound (50% from ocean-going ships, 33% from cargo handling).
- Aviation is responsible for an estimated 15% of total greenhouse gas emissions in the city of Seattle and surrounding community (about 1.1 million tons of CO₂ equivalents in 2000).
- In 2008, Port of Seattle's TEU (Twenty foot equivalent unit) count totaled 1,591,365.

Sea-Tac Airport's 2006 Environmental Footprint⁶

Electricity	149,691 MWH
Fuel	435,270,748 gal Jet A 11,067 gal diesel 187,128 gal gasoline 2,657,420 therms natural gas 181,111 gge CNG
Air Emissions	12,009 tons CO 1,860 tons NO _x ; 28 tons PM
Treated Stormwater	420,000,000 gallons
Noise Impacts	Affects 4,076 acres
Hazardous Waste Disposal	3,512 pounds

US Ports and Public Health^{7,8}

- Port vessel diesel exhaust creates air pollution that affects the health of port workers and surrounding communities.
- Diesel exhaust increases cancer risks, and is responsible for 70 percent of the cancer risk from air pollution.
- Sources of diesel emissions include diesel-powered trucks, buses and cars (on-road sources); diesel-powered marine vessels, construction equipment, trains and aircraft support equipment (non-road sources).
- Major air pollutants from diesel engines at ports that can affect human health include particulate matter (PM), volatile organic compounds (VOCs), nitrogen oxides (NO_x), and sulfur oxides (SO_x).
- The health effects of pollution from ports may include asthma, other respiratory diseases, cardiovascular disease, and lung cancer.
- In children, these pollutants have been linked with asthma and bronchitis, and high levels of the pollutants have been associated with increases in school absenteeism and emergency room visits.
- Children living near busy diesel trucking routes are more likely to suffer from decreased lung function, wheezing, bronchitis, and allergies.

Featured Center Investigators



Sally Liu – Dr. Liu's research involves monitoring and modeling indoor, outdoor, and personal exposures to air pollutants; assessing exposures to and health risks of hazardous air pollutants; assessing exposure to diesel exhaust and bus's self-pollution; and developing hybrid models including dispersion, temporal components, and land-use regression to predict source-specific air pollutant exposures.

See **Diesel Bus Study**: <http://depts.washington.edu/uwbus/>



Joel Kaufman - Dr. Kaufman directs a major epidemiological study of air pollution, atherosclerosis and clinical cardiovascular disease. The project involves state-of-the-art assessment of cardiovascular disease in a multi-ethnic population, combined with sophisticated air pollution measurements and modeling. Dr. Kaufman also directs an inhalation toxicology facility addressing health effects of diesel exhaust in human subjects.

See **MESA Air Pollution**: <http://depts.washington.edu/mesaair/>



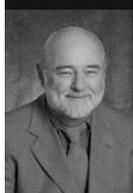
Catherine Karr – Dr. Karr's research involves large epidemiological studies of the impact of ambient air pollution on infant and child respiratory health.

See **Pediatric Environmental Health Specialty Unit**: <http://depts.washington.edu/mesaair/>



Jane Koenig - Dr. Koenig's main research interest is the respiratory and cardiac health effects of air pollution, especially the responses of individuals judged to be susceptible, such as persons with asthma or other chronic respiratory diseases. She has studied associations between emergency room visits for asthma and particulate matter air pollution in Seattle.

See **Northwest Center for Particulate Matter and Health**: <http://depts.washington.edu/mesaair/>



Dan Luchtel - Dr. Luchtel's research interests are in the cellular and molecular responses of the respiratory system to air pollutants. Current project include studying the effects of gaseous air pollutants (ozone, nitrogen dioxide, and sulfur dioxide) in cultured human nasal cells and primate lung cells.

See **Particulate Matter Center**: <http://depts.washington.edu/pmcenter/>

Forming a Partnership – How Can Community Members Get Involved With Research?

- Become a trained data collector
- Participate in advocacy work
- Become a member in a stakeholder group
- Become an IRB member
- Help in the generation of research topics
- Provide input on research methods, interpretation of findings, and dissemination of results



The Center for Ecogenetics and Environmental Health (CEEH) brings together a set of talented investigators who study the ways genetic and environmental factors interact to influence susceptibility to disease. Investigators are currently researching gene-environment interactions related to asthma, cancer, birth defects, and adverse reactions to drugs and chemicals. The Community Outreach and Education Core (COEC) seeks to improve public understanding of the research conducted at the Center, as well as the fundamental concepts of environmental health. The COEC also focuses on highlighting the ethical, legal, social and policy implications that may arise while conducting research. For more information, please contact Jon Sharpe, COEC Manager, at 206.685.5333 or jsharpe@u.washington.edu.

REFERENCES

1. Images courtesy of the Port of Seattle
2. Brown, L. "Foreign Waterborne Trade Report." Port of Seattle. 2007. <<http://www.portseattle.org/downloads/seaport/Summary%20of%20Foreign%20Waterborne%20Trade.pdf>>
3. Port of Seattle. "Port of Seattle Quick Facts." 1/19/2009 <http://www.portseattle.org/downloads/about/Quick_Facts2008_1.pdf>
4. Aggarwal, S., M. Horner, and Z. Wang. "The Impact of Global Warming Induced Mean Sea Level Rise on the Puget Sound Coastal Zone." 2008. <<http://www.portseattle.org/downloads/seaport/mcps.pdf>>
5. Synergy Consultants, Inc. "Greenhouse gas emissions inventory." 2006. 1/29/2009 <http://www.portseattle.org/downloads/about/commission/RM_20080325_6b_Report.pdf>
6. Clean Airport Partnership, Inc, Port of Seattle, and Green Works. "Managing a Green Airport." August 2007. 1/19/2009 <<http://www.portseattle.org/downloads/community/environment/greenairport.pdf>>
7. Bailey, D., et al. "Harboring Pollution: The Dirty Truth about US Ports." Natural Resources Defense Council. August 2004. <<http://www.nrdc.org/air/pollution/ports/contents.asp>>
8. Environmental Protection Agency. "Six common pollutants | air & radiation" US EPA. 2009. <<http://www.epa.gov/air/urbanair/6poll.html>>